AWIPS INFORMATION NOTE 1 (for Electronic Systems Analysts)
Engineering Division
W/OSO32: LTB

SUBJECT : AWIPS Program Information

PURPOSE : Provide information about systems management and administration, maintenance, and logistics support services in the Advanced Weather Interactive Processing System (AWIPS) Development and Deployment Phases.

SYSTEM DESCRIPTION

The National Weather Service (NWS) mission is to provide the nation with complete, accurate, and timely meteorological and hydrological warning and forecast services. In support of this mission, the modernization and associated restructuring activities were established. AWIPS, as a key component of NWS modernization, will provide an integrated suite of powerful automated data processing equipment and state-of-the-art, wide-area-network communications services.

AWIPS will be deployed to 119 Weather Forecast Offices (WFO), 13 collocated WFO and River Forecast Centers (RFC), the three centers under the National Centers for Environmental Prediction and to the Spaceflight Meteorology Group. The telecommunications network consists of the Network Control facility (NCF) sited at NWS headquarters (NWSHQ), the Satellite Broadcast Network (SBN), and the dedicated terrestrial Wide Area Network (WAN). NOAAPORT Receive System (NRS) receive-only ground stations at Bohemia, Fort Worth, Kansas City, Salt Lake City, Denver, and Boulder will become AWIPS sites by the end of the Deployment Phase.

AWIPS Hardware. AWIPS hardware consists of communications networks, Hewlett-Packard (HP) computing platforms, and GTE Spacenet (GTE) satellite broadcast equipment in eight hardware configuration items; each hardware configuration item, e.g., workstation, applications processor, contains maintenance-significant equipment and/or components.

AWIPS Computer Software. AWIPS computer software is designed, developed, and integrated for operation on the HP computing platforms using the HP-UNIX operating system. This operating system controls the activities and resources of the computer and provides local "toolbox" capabilities such as file editing and text processing. There are two generic types of computer software configuration items: Computer programs developed and/or furnished, documented and supported by the AWIPS prime contractor, and Government-furnished, documented, and maintained software.

Software-driven system capabilities will be incrementally expanded throughout the Development and Deployment Phases by incremental software "builds" and interim "releases." Development Phase sites were installed with Build 1; capabilities will subsequently be enhanced by planned Build 2 in early 1997. Build 3, targeted for late 1997, will integrate the Forecast Systems Laboratory's WFO-Advanced (FOA) system and applications software for Development Phase systems. Subsequent Builds will be developed and installed as pre-planned improvements.

NETWORK CONTROL FACILITY

PRC, Incorporated (PRC), the AWIPS prime contractor, is responsible for operation of the NCF which is the operational and maintenance "hub" of the network system. As AWIPS systems are deployed, PRC will expand the services provided for development phase sites to include:

a. Managing and supporting the NCF centralized data retention capability.

b. Monitoring central interfaces, the AWIPS Communications Network (ACN), and site equipment for actual and anticipated failures. The NCF identifies and diagnoses site problems, resolves them remotely where possible, provides guidance on temporary workarounds and, if required, dispatches appropriate technicians to the site.

c. Monitoring the performance of AWIPS FTS2000 resources and reporting outages or degradations directly to the FTS control center. The NCF monitors the progress of the FTS contractor; where appropriate, escalates problems to higher FTS levels.

d. Monitoring the performance of AWIPS SBN resources and reporting problems directly to the GTE control center. The NCF monitors the progress of GTE in failure/degradation correction and, where appropriate, escalates trouble reports to higher GTE levels.

e. Providing around-the-clock technical support to users. This support permits site personnel to obtain correct and timely technical assistance as well as guidance regarding hardware, software, communications, and operational procedures. All calls for maintenance support for all deployed systems and software (regardless of whether it is Government Furnished Information (GFI), contractor-developed, or COTS) go to the NCF for resolution or referral to the appropriate activity.

f. Initiating hardware and software trouble tickets, tracking PRC and TDL/OH progress in problem resolution, and reporting overage trouble ticket status for PRC and NWS management attention.

g. Responding to NWS requests for test messages, message/product timeliness surveys, and reports of ACN traffic, site status, network performance, queue lengths, problem resolution, and other measured parameters monitored by the NCF.

h. Implementing dedicated NWS electronic access to information stored by the NCF.

I. Supporting the distribution, under configuration management control, of authorized AWIPS software to AWIPS field sites and the controlled distribution of locally developed AWIPS authorized software between sites.

j. Responding to NWS requests for inventory control reports to determine the location and configuration of all ACN components, including ports, connections, modems, processors, routers, and/or other special communications equipment.

The NCF Operations Concept Description (OCD) in Section 4.0 of this handbook more completely describes the mission, role, and functions of the NCF.

AVAILABILITY CENTERED MAINTENANCE CONCEPT

The AWIPS contract structure is based on the concept that PRC, as the prime contractor responsible for system/site maintenance and support, designs, assembles, integrates, and delivers systems to meet or exceed specified functional availability values. Thus, specific reliability (mean-time-between-failures) and maintainability (mean-time-to-repair) values are not specified by the contract. Delivered, operational systems are expected to have the combination of high-reliability commercial off the shelf (COTS) components, responsive maintenance diagnostic software, component redundancy, NCF-directed reconfiguration capabilities, and rapid reaction contract maintenance teams to meet threshold values ranging from .985 (all functions for each workstation) to .999 (critical functions for at least one WFO workstation).

SYSTEM MANAGEMENT AND ADMINISTRATION

Electronic Systems Analysts (ESA) have the overall responsibility for the systems management, maintenance, and logistics support of interrelated modernization systems. The staff complement at each AWIPS site includes an ESA, GM-0334-12/13, who is responsible for coordinating or performing system administration/management. At WFOs, the ESA is assisted by one or more Electronics Technicians (ET), GS-0856-11; at collocated RFCs the electronics staff is supplemented by an ET, GS-0856-12 or Computer Specialist, GS-0334-12, to function as an ESA assistant. The following table illustrates the interrelationships between and among systems management and administration, maintenance, and AWIPS site staff elements. Acronyms are defined in Attachment 1.

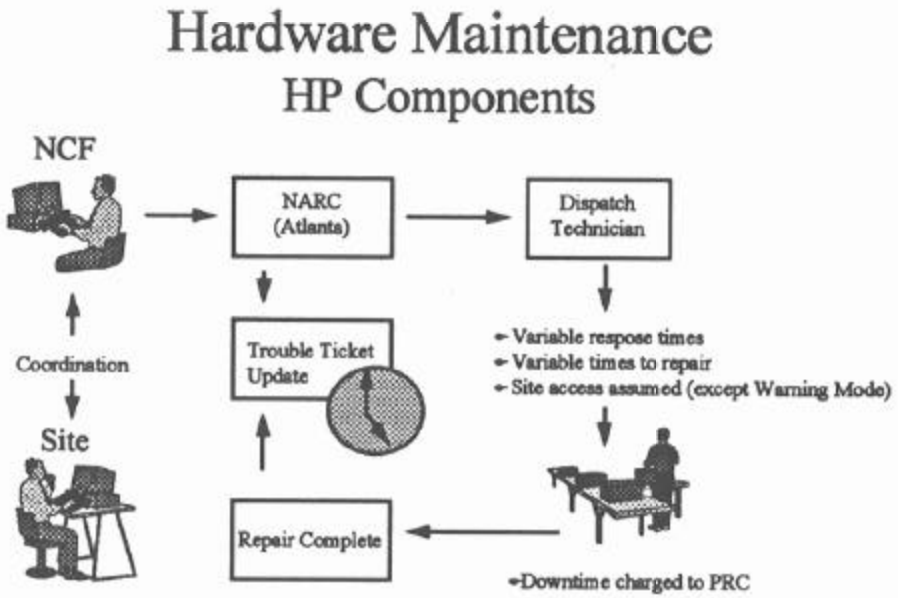
Site Roles and Responsibilities

Site Maintenance Tasks	Support Structure		
	First	Second	Third
Database administration	AFP	SOO / DOH	ESA
Routine system administration duties	ESA	AFP	SOO / DOH
Coordinate with NCF and maintenance contractor	ESA	Site ETs	SOO / DOH AFP
AWIPS system monitoring	NCF	ESA	
Interface problems among systems	ESA	Site ETs	
Applications software	SOO / DOH	ESA	
LAN administration duties	ESA	DAPM	SOO / DOH
Communications management	ESA	Site ETs	SOO / DOH AFP
Site logs, statistics, quality assurance reports	ESA		
Consult, train system users	SOO / DOH	ESA	

Each WFO and collocated WFO/RFC designates the ESA and an alternate as the AWIPS System Administrator. Typically, the ESA, ESA assistant at collocated offices, Science and Operations Officer (SOO), Development and Operations Hydrologist (DOH), and AWIPS Focal Point (AFP) receive formal system administrator training. Routine tasks include performing backup and restoration of locally developed software, site-specific data, and any configuration files customized by site personnel. When system administration tasks are initiated by the NCF, the System Administrator works with the NCF to perform steps that require human intervention at the site. The System Administrator oversees contract maintenance work, advises the NCF of progress or problems, and confirms that work has been satisfactorily completed. The System Administrator installs system software upgrades and ensures that all site functions operate normally after the software upgrade. The System Administrator also manages locally developed software, administers locally assigned passwords, ensures local network security, and sets system parameters (file retention times, removal of temporary files, etc.).

HARDWARE MAINTENANCE

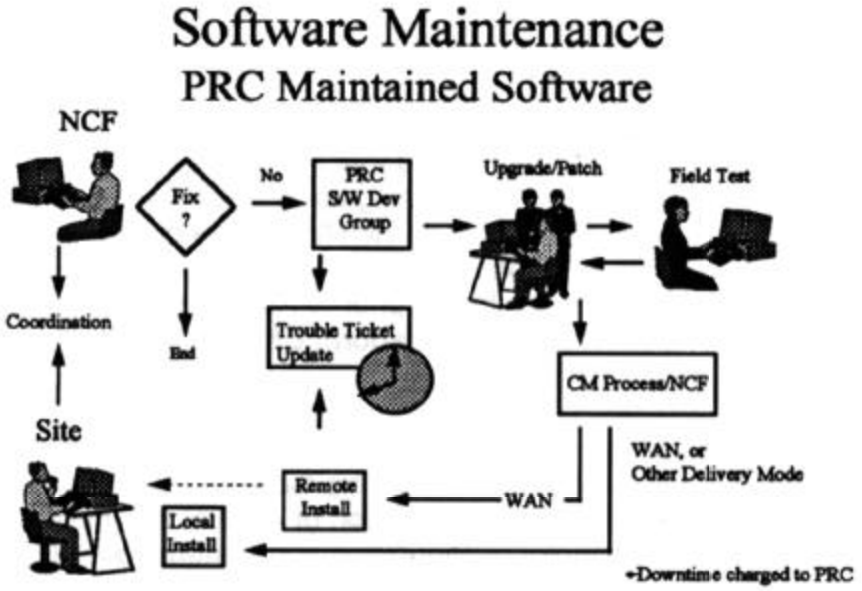
PRC manages the maintenance of PRC-supplied equipment and components. Using the central NCF Help Desk, PRC directs HP and GTE maintenance technicians to AWIPS sites; off-shift (after normal working hours) failures are handled as shown in Attachment 2. Contract technicians replace failed items, components, and parts; return repairables to the HP or GTE depot; and perform preventive maintenance, except for normal external inspection and cleaning. The flow for HP maintenance is illustrated below.

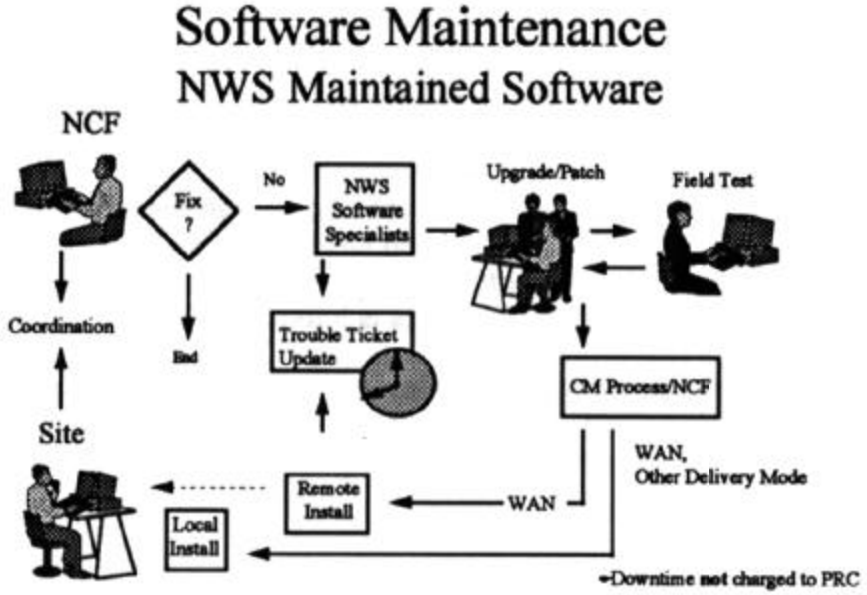


Corrective maintenance of associated FTS2000, Metro Fiber Systems, and GTE communications devices is coordinated through the NCF. Preventive and corrective maintenance of other (non-PRC supplied) office and facilities equipment is a local site responsibility.

SOFTWARE MAINTENANCE

Responsibility for software maintenance is divided between PRC and NWS. PRC maintains PRC-developed and PRC-supplied COTS software. NWSHQ (Techniques Development Laboratory (TDL) and Office of Hydrology (OH)) maintains government furnished AWIPS Hydrometeorological Applications software; the National Centers for Environmental Prediction (NCEP) maintains government furnished NCEP applications software; and NWS regions/sites maintain locally developed software. The PRC and NWS software maintenance processes are illustrated by the following graphics.





MAINTENANCE REPORTING

Maintenance reporting is accomplished in accordance with Engineering Handbook 4, Engineering Management Reporting System. Typically, the ESA will report system administration work on a biweekly basis using instructions contained in EHB-4, Appendix H.

MAINTENANCE QUALITY ASSURANCE

PRC maintains a quality assurance program that adheres to the requirements of ISO 9001(Quality Systems - Model for Quality Assurance in Design/Development, Production, Installation and Servicing) and any supplemental requirements imposed by the AWIPS contract. NWS quality control is maintained in accordance with EHB-12, Engineering Quality Program.

STAFF DEVELOPMENT AND TRAINING

Staff Development. Overall staff development and training for the NWS electronics community is managed in accordance with the Integrated Training and Professional Development Plan for the Modernization and Associated Restructuring of the NWS. The conversion of ESAs from the GS-0856-12 to the GS-0334-13 classification is being accomplished in accordance with criteria published October 3, 1995. Conversion is allowed prior to AWIPS delivery for those ESAs that have developed skills and expertise necessary to perform UNIX systems administration functions.

Pre-installation Orientation Training Material. As software Builds are completed, PRC develops and updates pre-installation orientation/training materials for field site personnel. These materials contain an introductory level description of AWIPS and its capabilities and provide explanations of site-level hardware configuration and system operations, communications concepts, and anticipated benefits over current capabilities. Copies are provided at least 2 weeks prior to centralized training.

On-site User Training. After delivery and installation, PRC provides on-site user training. This on-site, instructor-led training focuses on workstation operations and the use of AWIPS applications software. Training instructs users in the operation of the site-level system and provides hands-on use of the AWIPS workstations for product display and manipulation, user interface, product generation/message composition, product routing, and applications use.

Centralized User Training. PRC provides two series of comprehensive operations and software training courses at the NWSTC. Each of the training sessions can accommodate up to 15 students per session. The first series of centralized training sessions is for Government personnel from AWIPS field sites; the second series is intended for Government instructors.

Centralized training for field site personnel covers system management, operations procedures, and software development procedures. This course provides more depth than the on-site training, and in addition to the material presented during on-site training, includes instruction in

AWIPS computer operations, system and applications software, security, and AWIPS data base management as these capabilities are developed in the sequential Builds. Users are instructed in procedures to develop, test, install, document, and maintain locally developed software as well as identifying basic system malfunctions and initiating procedures for corrective action.

The second series of courses is for NWSTC resident Government instructors who will assume centralized training responsibilities following the Deployment Phase. Each of two 20-day courses will teach Government instructors to conduct user-oriented courses covering all aspects of AWIPS system operation, including AWIPS computer operations, system and applications software, data base management, reconfiguration in support of backup and degraded modes, high-level fault recognition, and the automated user training.

Training Materials. PRC provides separate on-site and centralized training materials consisting of lesson plans, instructor guides, and student guides. Content is based on the User's Manual, System Manager's Manual, Local Software Development Manual, and Communications Interface Documentation.

Training materials cover all areas of on-site and/or centralized training and describe the objective of each lesson, the knowledge and skill level required to use the material, the time required to complete the material, and plans to update the material as system upgrades are developed. Lesson plans outline individual lesson content, lesson objectives, planned presentation media, time necessary to complete each module, and individual skill and knowledge levels required to begin the modules.

Copies of training materials, e.g., video tapes, workbooks, and case study scenarios, are provided to all sites. PRC is responsible for upgrading the materials after each AWIPS software Build.

Prerequisites for Training. Prospective students are expected to have knowledge of UNIX and the graphical user interface environment.

SUPPLY SUPPORT

The AWIPS maintenance concept provides for full maintenance management and performance by PRC and HP/GTE subcontractors. Under this concept, all maintenance spares and repair parts incident to equipment repair, refurbishment, and/or modification are supplied by PRC or HP/GTE.

Field Supply Support. Site responsibilities are limited to common-use consumables (such as printer cartridges, computer paper, and cleaning materials) required for day-to-day site operations. PRC and the designated HP/GTE maintenance technicians furnish all required maintenance spares and repair parts under the contractor maintenance services concept.

Depot Supply Support. Depot-level repair, including repair parts support, is the responsibility of PRC and its subcontractors.

Preservation, Packing, and Packaging. PRC and its subcontractors provide all maintenance spares and repair parts incident to preventive and corrective maintenance. Hence, AWIPS

operating sites are not required to preserve, pack, and/or package spares and repair parts for shipment or storage.

Storage. There are no unique or extraordinary storage requirements to support AWIPS installation, test, and maintenance. Approximately 25 linear feet at WFOs and 50 linear feet at collocated RFCs are required to shelve AWIPS technical documentation.

Transportation. Requirements for NWS-arranged or managed transportation is limited to mail and express package delivery of technical data and documentation.

SUPPORT EQUIPMENT AND DIAGNOSTIC SOFTWARE

AWIPS system design and the AWIPS maintenance concept minimize requirements for general and special purpose support and test equipment. On-line diagnostics and the remote maintenance monitoring capabilities of the NCF are supplemented by PRC/subcontractor maintenance technicians who have all required tools, test equipment and diagnostic software.

Support Equipment. Support equipment, including special tools, is a PRC responsibility. NWS will not provide any additional capabilities at AWIPS Deployment Phase sites.

Test Equipment. All AWIPS general and special purpose test equipment is a PRC responsibility. NWS will not provide any additional capabilities at AWIPS sites.

TECHNICAL DATA AND DOCUMENTATION

Contractor Documentation. This section describes the technical data and documentation that PRC provides at AWIPS sites.

a. User's Manuals. A separate user's manual for each type of AWIPS site (WFO, collocated RFC, NC, and NCF) is a stand-alone document written for site personnel. Manuals provide sufficient information to enable the sites to utilize all applicable AWIPS functionality.

b. System Manager's Manuals. A separately bound manual for the AWIPS System Managers at each site describes any functions not applicable to all users, including communications management, data base management, system administration, maintenance or security functions (such as password assignments), and system fault recognition and recovery procedures. The System Manager's Manual can be used in conjunction with the Database Management System Manual to provide all information for the local AWIPS system manager to control and administer the system. This information is typically required by the AFP, ESA, SOO, and DOH.

c. Maintenance Documentation. PRC will deliver documentation to NWSHQ describing details of contract hardware preventive and corrective maintenance requirements and procedures. NWSHQ (W/OSO32) will subsequently distribute this documentation to field sites through EHB-13, Series II directives.

d. Local Software Development Manual. This manual details the techniques,

tools, capabilities, and facilities available to AWIPS users to support local software development.

e. Database Management System Manual. The Database Management System Manual supports the database administrator's responsibilities at NWSHQ and field sites.

g. Communications Interface Documentation. Communications interface documentation provides designated users with the procedures necessary to configure, setup, support, and access AWIPS communications capabilities.

h. Equipment Manuals. COTS equipment manuals are delivered with AWIPS systems to each site.

NWS Documentation. The deployment and operation of AWIPS systems requires update and modification of NWS management, engineering, and logistics documentation.

a. Weather Service Operations Manual (WSOM). NWSHQ (W/OSO32) is responsible for updating Part H, WSOM chapters.

b. Engineering Handbooks. NWSHQ (W/OSO32) is responsible for updating affected EHBs. AWIPS engineering directives are contained in EHB-13, Series II.

c. Facilities Notes. To be issued in accordance with EHB-3, Facilities.

Data Repository. NWSHQ (Wx22) coordinates the distribution of contractor documentation and is the initial point of contact for the replacement of lost/missing contractor documentation.

Data Modification and Revision Control. PRC is contractually required to revise technical data and documentation to incorporate changes in system, equipment and software configuration. Revisions and updates are controlled by the NWS configuration management process.

NWSHQ (W/OSO32) is responsible for modification and revision control of WSOM Part H content, EHBs, and facilities notes.

COMPUTER RESOURCES

Computer Software. PRC is responsible for life cycle support of system software, top-level computer software components, and associated applications program interfaces. This responsibility includes COTS software. TDL, OH, and NCEP are responsible for life cycle support of government furnished software.

Computer Software Documentation. Contractor-supplied computer software documentation for AWIPS sites consists of local software development and database management system manuals. To supplement this documentation, TDL and OH are developing a user-oriented HM applications software guide. This guide will be consistent in format with the contractor-supplied user's and system manager's manuals.

Contractor Software Maintenance. AWIPS software includes an integrated mix of PRC-developed system software, PRC-supplied COTS software, Government-developed HM

application software, and locally developed software. The NCF provides the first level of operational support and maintenance for all except the locally developed software. Although the NCF takes the initial trouble report and initiates action, PRC is only responsible for maintenance of the PRC-developed software and PRC-supplied COTS software.

NWS Software Maintenance. The NCF accepts the initial trouble reports for all software-related problems. For trouble reports that refer to Government-developed application software, the NCF contacts designated NWS personnel to resolve the problem. OH is the focal point for RFC software; TDL is the focal point for all WFO applications including those hydrologic applications that run in the WFO; and NCEP is the focal point for National Center applications. For locally developed software, the NWS site or region provides a focal point responsible for maintaining the local applications.

FACILITIES PREPARATION AND INSTALLATION

NWSHQ and PRC will continue to closely coordinate facilities preparation activities with Regional Modernization Teams and NWS site managers. These activities include site surveys, survey reports, installation plans, and installation drawings.

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Chief, Engineering Division

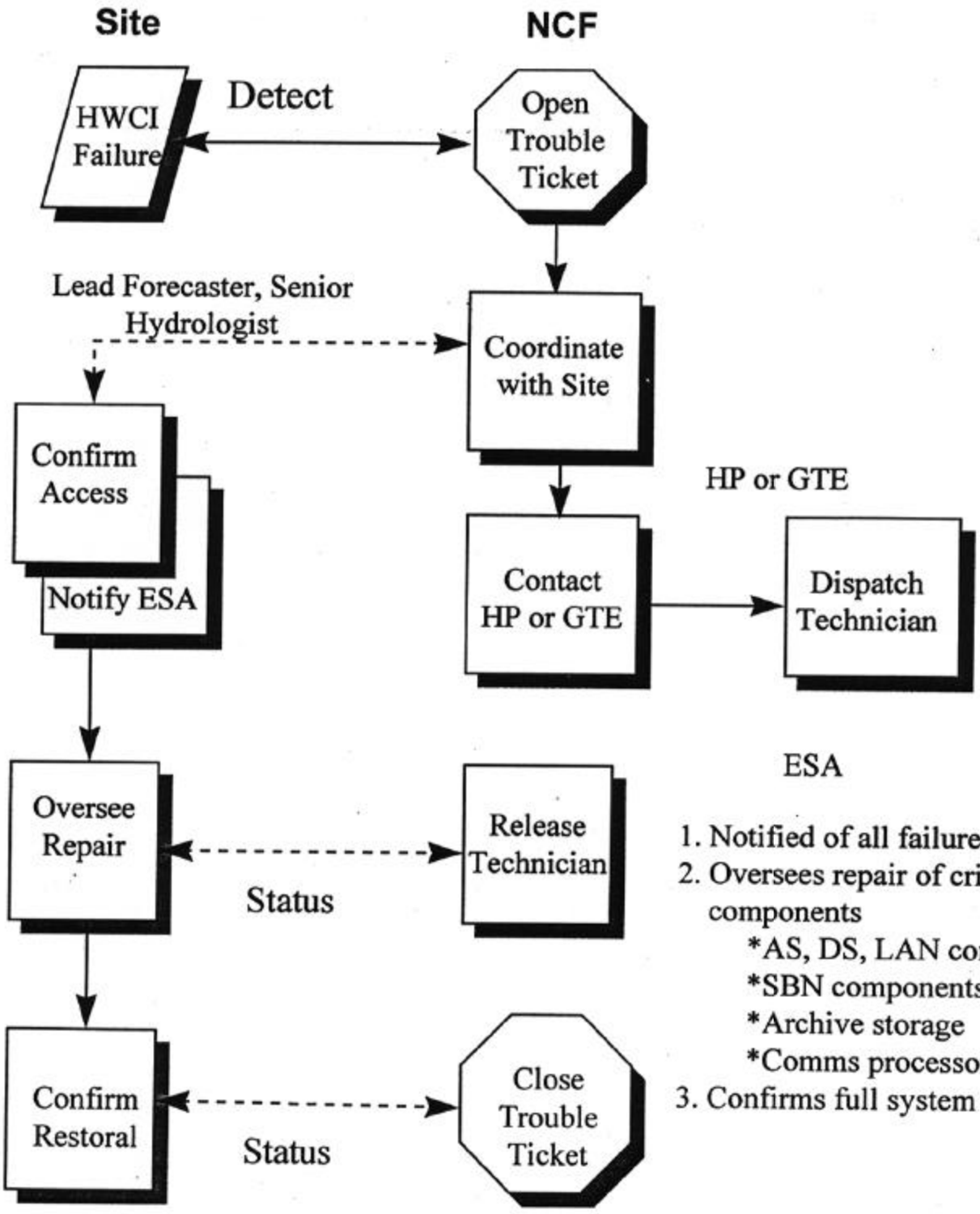
Attachments:
1. Acronyms, Abbreviations, and Definitions
2. Off-Shift Repair Decision Process

ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

Acronym	Definition
ACN	AWIPS Communications Network
AFP	AWIPS Focal Point
AWIPS	Advanced Weather Interactive Processing System
CM	Configuration Management
COTS	Commercial Off the Shelf
DAPM	Data Acquisition Program Manager
DOH	Development and Operations Hydrologist
EHB	Engineering Handbook
ESA	Electronic Systems Analyst
ET	Electronics Technician
FOA	WFO-Advanced. System and applications software developed by Forecast Systems Laboratory
FTS	Federal Telephone Systems
GFI	Government Furnished Information
GTE Spacenet	GTE Spacenet, Incorporated. The name of the subcontractor responsible for supplying satellite broadcast components
HP	Abbreviation for Hewlett-Packard, the major hardware subcontractor
NC	National Center
NCEP	National Centers for Environmental Prediction
NCF	Network Control Facility
NOAA	National Oceanic and Atmospheric Administration
NOAAPORT	NOAA Broadband Communications System
NRS	NOAAPORT Receive System
NWS	National Weather Service

NWSHQ	.....	National Weather Service Headquarters
NWSTC	.....	National Weather Service Training Center
OCD	.....	Operations Concept Description
OH	.....	Office of Hydrology
PRC	.....	PRC, Incorporated. The name of the AWIPS prime contractor
RFC	.....	River Forecast Center
SBN	.....	Satellite Broadcast Network
SOO	.....	Science and Operations Officer
TDL	.....	Techniques Development Laboratory
WAN	.....	Wide Area Network
WFO	.....	Weather Forecast Office
WSOM	.....	Weather Service Operations Manual

OFF-SHIFT REPAIR DECISION PROCESS



ESA

1. Notified of all failures
2. Oversees repair of critical components
   - *AS, DS, LAN components
   - *SBN components, routers
   - *Archive storage
   - *Comms processors
3. Confirms full system restoral